

Xylazine in *Yin Tang* acupoint for sedation of dogs and cats

Xilazina no acuponto *Yin Tang* para sedação de cães e gatos

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Highlights

Pharmacopuncture, is the injection of low doses of drugs in acupuncture points.
Stimulus of *Yin Tang* point with small doses of sedatives causes sedation in animals.
Xylazine in subdoses in *Yin Tang* acupoint in dogs and cats promotes good sedation.

Abstract

Xylazine is a myorelaxant with sedative and analgesic effects that can be used in dogs and cats. The acupuncture point denominated *Yin Tang* has sedative effects when stimulated on animals. Thus, the objective of the present study was to evaluate if xylazine in subdoses administered to dogs and cats in the *Yin Tang* acupoint has sedative effects as well as the therapeutic dose. Six dogs and six cats were used. The study comprised of four steps. In the first step (S1), the therapeutic dose was administered intramuscularly (IM). Second step (S2) was performed using one-tenth (1/10) of the dose used in S1 intramuscularly. In the third step (S3), the xylazine was applied in the acupoint *Yin Tang*, at the same dose used in S2. In the fourth stage (S4), physiological solution was administered in *Yin Tang* acupoint in the same volume administered in S3. The presence or absence of decubitus, somnolence, and other signs indicative of sedation were investigated in all steps and all animals. There was no statistically significant difference between the groups ($p < 0.05$). It was concluded that xylazine administered in subdoses in the *Yin Tang* acupoint in dogs and cats promotes sedation similar to the therapeutic dose administered intramuscularly.

Key words: Acupuncture. Canine. Feline. Pharmacopuncture. Tranquilizer.

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Resumo

A xilazina é um miorrelaxante com efeitos sedativos e analgésicos que pode ser utilizado em cães e gatos. O ponto de acupuntura denominado *Yin Tang* tem efeitos sedativos quando estimulado em animais. Assim, o objetivo do presente estudo foi avaliar se a xilazina em subdoses administradas a cães e gatos no acuponto *Yin Tang* possui efeitos sedativos assim como a dose terapêutica. Seis cães e seis gatos foram utilizados. O estudo compreendeu quatro etapas. Na primeira etapa (E1), a dose terapêutica foi administrada por via intramuscular (IM). A segunda etapa (E2) foi realizada com um décimo (1/10) da dose utilizada em E1 por via intramuscular. Na terceira etapa (E3), a xilazina foi aplicada no ponto de acupuntura *Yin Tang*, na mesma dose utilizada em E2. Na quarta etapa foi administrada solução fisiológica no acuponto *Yin Tang* na mesma dose empregada em E3. Foi investigada a presença ou ausência de decúbito, sonolência e outros sinais indicativos de sedação em todas as etapas e em todos os animais. Não houve diferença estatisticamente significativa entre os grupos ($p < 0,05$). Concluiu-se que a xilazina administrada em subdose no acuponto *Yin Tang* em cães e gatos promove sedação semelhante à dose terapêutica administrada por via intramuscular. **Palavras-chave:** Acupuntura. Canino. Felino. Farmacopuntura. Tranquilizante.

Pharmacopuncture, defined as the injection of low doses of drugs or small amounts of extracts of medicinal products in acupuncture points, represents an alternative method to stimulate the acupoints. (Luna et al., 2015). *Yin Tang* acupoint is an extra-meridian point that lies at the intersection of a line drawn between the medial commissures of the eyes (Wen, 1985). The stimulation of this point with small doses of tranquilizing drugs promotes sedative effects in animals (Cassu et al., 2014; Farias et al., 2014).

Xylazine is a centrally acting myorelaxant, often used in dogs (Massone, 2011), belongs to the group of α_2 agonists, routinely used as pre-anesthetics for general anesthesia due to important characteristics such as sedation, anxiolytic effect, analgesia, reduction of anesthetic demands, better intraoperative stability, and facilitation of induction of anesthesia (Caires & Clark, 2014). The recommended dose for dogs is 1 mg/kg, and for cats, it ranges from 0.5 to 0.8 mg/kg (Massone, 2011). This study aimed at assessing if the administration of low doses

of xylazine in the *Yin Tang* acupoint in dogs and cats has a sedative therapeutic effect.

Six dogs and six cats of both sexes, with varying ages and weights, and that were assisted by the Veterinary Hospital (VH) of the Paranaense University (UNIPAR) were used. A complete physical examination was performed on all animals, and only animals considered healthy were examined. The animals were subjected to feed fasting for 12 hours and water fasting for six hours. The study consisted of four stages (S1, S2, S3, S4), and each of these stages lasted one week. The tests were randomized and each selected animal participated in all stages. The therapeutic doses used in both species were based on the literature (Cortopassi & Fantoni, 2010; Massone, 2011). In dogs a dose of 1mg/kg was used and in cats 0.5mg/kg. In the first stage (S1), the therapeutic dose (1 mg/kg for dogs and 0,5 mg/kg for cats) of xylazine was administered intramuscularly (IM). One week later, step 2 (S2) was performed using one tenth (1/10) of the recommended dose for S1, and xylazine was administered IM.

In third stage (S3) xylazine at the same dose used in S2 was administered to the *Yin Tang* acupoint. We used a 26-G needle attached to a 1-mL syringe for the administration of the drug to the Yin Tang acupoint (Figure 1). In the fourth stage (S4), physiological solution was administered in *Yin Tang* acupoint in the same volume administered in S3 (Table 1).

The following physiological parameters were measured during the all stages: heart rate (HR), respiratory rate (RR), and body temperature (BT). Evaluators recorded all obtained data on individual sheets in a blind fashion. These measurements were made at four different times: immediately before treatment, 20 min after treatment, 40 min after treatment, and 60 min after treatment. The presence or absence of decubitus, drowsiness, and other signs indicative of sedation were investigated at all timepoints by each evaluator. HR was obtained by counting heartbeats in one

minute, using a stethoscope. RR was obtained by observing the thoracic expansion over one minute. BT was evaluated using a clinical veterinary thermometer introduced directly into the rectum and maintained for one minute for reading. A score, attributed according to a table, was used to determine the degree of sedation (evaluated at the same times already described) (Table 1) (Farias et al., 2014). Animals that obtained grade 2 in all parameters were considered to have satisfactory sedation; sedation was considered moderate when the average of the parameters was 1, and no sedation when the average of the parameters was 0. Observations were conducted by veterinary medicine students of UNIPAR in a double-blind fashion. The evaluators were trained to apply the scale used. In case of disagreement between evaluators, the evaluator's scale that presented the lowest sedation score was used.

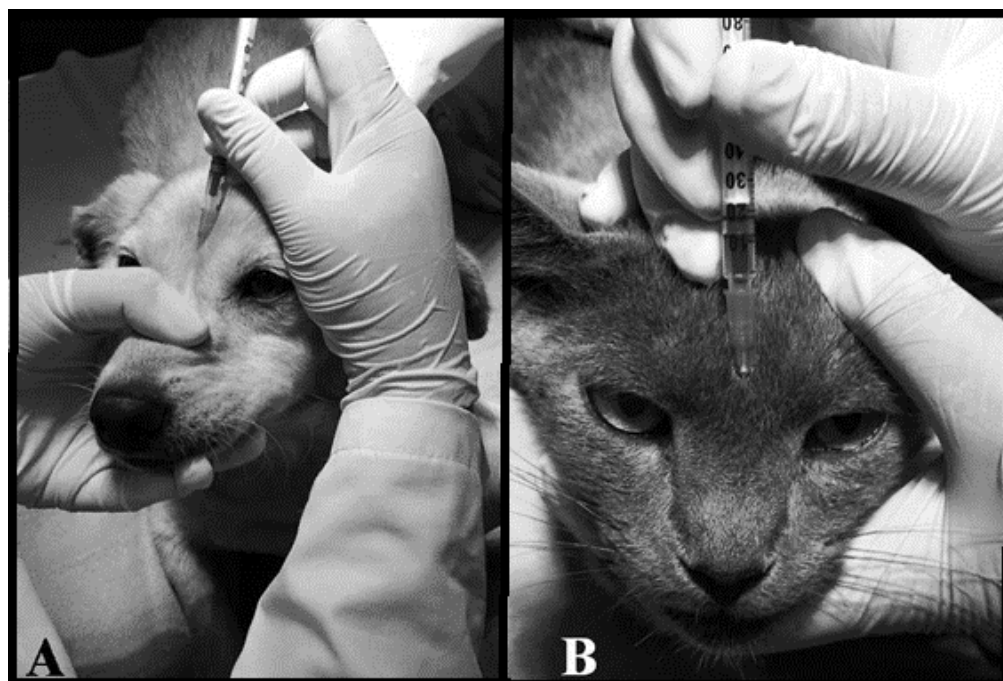


Figure 1. Administration of low doses of xylazine in the Yin Tang point in a cat and a dog, A: Dog, male, mixed breed, five years old. B: Cat, male, mixed breed, three years old.

Table 1
Pharmacopuncture in dogs and cats using the *Yin Tang* acupoint: steps (S) of drug administration with doses and routes. (IM: intramuscular; YT: *Yin Tang*). PS (physiological solution). Average clinical parameters; Number and percentage of dogs (n=6) and cats (n=6) sedated with xylazine

	S1 - IM		S2 - IM		S3 - YT		S4 - YT	
Drugs and dose	1 mg/kg Xylazine (dogs) 0,5 mg/kg (cats)		0,1 mg/kg Xylazine (dogs) 0,05 mg/kg (cats)		0,1 mg/kg Xylazine (dogs) 0,05 mg/kg (cats)		PS (same volume administered in S3)	
Heart rate – beats per minute								
	S1 - IM		S2 - IM		S3 - YT		S4 - YT	
	Before	After	Before	After	Before	After	Before	After
Dogs	110,6	106,6	117,3	109,9	111,3	99,5	118	106,4
Cats	174,5	144,4	172,3	148,8	169,3	154,2	160,8	174,6
Respiratory frequency – movements per minute								
	S1 - IM		S2 - IM		S3 - YT		S4 - YT	
	Before	After	Before	After	Before	After	Before	After
Dogs	30,3	37,5	38	31,7	33,3	31,3	34	33
Cats	62,6	47	67,5	60,3	83,5	59,8	63,5	73
Temperature °C								
	S1 - IM		S2 - IM		S3 - YT		S4 - YT	
	Before	After	Before	After	Before	After	Before	After
Dogs	38,7	38	38,3	37,8	38,2	37,9	38,4	38
Cats	38,3	38	38,5	37,9	38,4	38,1	38,2	38,3
Number and percentage of sedated animals								
	S1 - IM		S2 - IM		S3 - YT		S4 - YT	
	Nº	%	Nº	%	Nº	%	Nº	%
Dogs	2	33,4	1	16,6	4	66,6	0	0
Cats	5	83,4	2	33,4	4	66,6	4	66,6

Statistical analysis of the degree of sedation was performed comparing the stages with each other using the Fisher's exact test. A table with clinical parameters (HR, RR, and BT) was prepared. A significance level of 5% was used in all statistical tests.

The drugs were easily administered in the *Yin Tang* acupoint in all animals (Figure 1). None of the evaluated animals died. Similar studies with dogs and cats did not report

deaths (Amorim et al., 2014; Cassu et al., 2014; Farias et al., 2014). Serious adverse effects such as seizures, coma and ataxia were also not observed. Thus, it is suggested that the technique can be used safely in the two species analyzed. Among the indications of the technique, it is suggested the use in clinical situations such as pre-anesthetic medication, examinations that cause discomfort to the animal, cytology and fluid aspiration, restraint

of aggressive patients, and reduction of stress caused by clinical interventions (Amorim et al., 2014).

There was a reduction in the clinical parameters evaluated (HR, RR, and BT) with the use of xylazine in S1, S2 and S3 (Table 1). Such results are expected when tranquilizing drugs are used in animals, as used in this study (Massone, 2011; Amorim et al., 2014). However, the reduction was not below the physiological limits of the species and did not cause clinically detectable adverse changes. Changes in HR or RR around 20% of the baseline value and BT drop around 20% of the baseline value are considered complications (Mastrocinque et al., 2006). This did not occur at any timepoints.

In relation to the degree of sedation, there was no statistically significant difference between the stages S1 and S3 ($p < 0.05$) in the two species; hence, the proposed technique produced sedation statistically equal to the sedation of the positive control group (therapeutic dose by intramuscular route) (Table 1).

A study administering xylazine to the *Yin Tang* acupoint in dogs also reported sedation of animals (Cassu et al., 2014). The administration of another α_2 -agonist (dexmedetomidine) to the VG-20 acupoint also produced sedation in dogs (Caires & Clark, 2014). These results suggest that this group of drugs can be successfully used to calm dogs in the pharmacopuncture technique.

Although no experiments with xylazine and this technique have been reported in feline specie, the results obtained here the results point in the direction that the drug administered in the *Yin Tang* acupoint is also safe and effective in cats.

Xylazine has relevant side effects in dogs and cats, and respiratory depression, hypotension and bradycardia may occur. Such changes caused by xylazine can be avoided by decreasing its dose (Cortopassi & Fantoni, 2010). Thus, this technique provides the safe administration of the drug, as there is a significant reduction in the dose considering that the therapeutic dose is 1mg/kg and 0.5 to 0.8mg/kg in dogs and cats, respectively (Massone, 2011). The dose used in S2 (*Yin Tang* pharmacopuncture) was 0.01 mg/kg. However, in the present study, animals with pathological alterations and were not included. Thus, the technique described here cannot be used in these animals without previous studies. Another factor considered important in bitches and queens is the use of xylazine in pregnant females. This drug is contraindicated in this type of patient (Mathews et al., 2022). Thus, the use of pharmacopuncture with xylazine is contraindicated in pregnant bitches and cats.

Further studies are needed with other drugs and doses in felines and dogs for effective implementation of the technique in the clinical routine of these species.

Therefore, it was concluded that low doses of xylazine at the *Yin Tang* acupoint in dogs and cats promotes sedation similar to the therapeutic dose by the intramuscular route.

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References

- Amorim, J. Neto, Quessada, A. M., Lopes, R. R. F. B., Alves, R. P. A., Borges, T. B., & Rufino, P. H. Q. (2014). Subdose de acepromazina no acuponto yin tang para tranquilização de cães. *Arquivos de Ciências Veterinárias e Zoologia da UNIPAR*, 17(4), 233-236. doi: 10.25110/arqvet.v17i4.5022.
- Caires, L. P., & Clark, R. M. O. (2014). Agonistas alfa-2 pela via epidural na analgesia de cães e gatos - revisão de literatura. *Veterinária e Zootecnia*, 21(3), 359-369. https://www.researchgate.net/publication/275961183_AGONISTAS_ALFA-2_PELA_VIA_EPIDURAL_NA_ANALGESIA_DE_CAES_E_GATOS_-_REVISAO_DE_LITERATURA_Alpha-2_agonistsby_epidural_analgesia_in_dogs_and_cats_-_review
- Cassu, R. N., Melchert, A., Canoa, J. T. B., & Martins, P. D. O. (2014). Sedative and clinical effects of the pharmacopuncture with xylazine in dogs. *Acta Cirúrgica Brasileira*, 29(1), 47-52. doi: 10.1590/S0102-86502014000100007
- Cortopassi, S. R. G., & Fantoni, D. T. (2010). Medicação pré-anestésica. In D. T. Fantoni, & S. R. G. Cortopassi (Eds.), *Anestesia em cães e gatos* (2a ed., cap. 13, pp. 217-227). São Paulo.
- Farias, D. S., Rocha, P. S., Caires, L. P., Silva, E. B., & Clark, R. M. O. (2014). Efeito sedativo da farmacopuntura com acepromazina e sua influência sobre a dose de indução anestésica com propofol em cães. *Ars Veterinaria*, 30(3), 73. <http://arsveterinaria.org.br/ars/article/view/847/924>
- Luna, S. P. L., Kelawala, N. H., Lima, A. F. M., Saarto, E. E., Restitutti, F. C., & Silva, N. E. O. F. (2015). Effect of aquapuncture on postoperative analgesia after ovariohysterectomy in dogs. *Semina: Ciências Agrárias*, 36(3, Supl. 1), 1979-1990. doi: 10.5433/1679-0359.2015v36n3Supl1p1979
- Massone, F. (2011). Medicação pré-anestésica. In F. Massone (Ed.), *Anestesiologia veterinária: farmacologia e técnicas* (6a ed., pp. 17-30). Rio de Janeiro.
- Mastrocinque, S., Imagawa, V. H., Almeida, T. F., Tatarunas, A. C., Matera, J. M., & Fantoni, D. T. (2006). Gonadectomia em gatas impúberes. Técnica anestésica. *Brazilian Journal of Veterinary Research and Animal Science*, 43(6), 810-815. <https://www.revistas.usp.br/bjvras/article/view/26561/28344>
- Mathews, K., Kronen, P. W., Lascelles, D., Nolan, A., Robertson, S., Steagal, P. V. M., Wright, B., & Yamashita, K. (2022). *Directivas para o reconhecimento, avaliação e tratamento da dor*. Global Veterinary Community. <https://wsava.org/wp-content/uploads/2020/01/Pain-Guidelines-Portuguese.pdf>
- Wen, T. S. (1985). Pontos extrameridianos. In T. S. (Ed.), *Wen, Acupuntura clássica chinesa* (pp. 158-183). São Paulo.